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24. It is required to effect an insurance on a given life in such a way that after n annual payments the premium shall be reduced one-half, after $2n$ payments it shall again be reduced one-half, and after $3n$ payments shall cease; determine the premiums.

Ans. The premium for the first n years

$$=\frac{4\mathrm{M}_x}{4\mathrm{N}_{x-1}-2\mathrm{N}_{x+n-1}-\mathrm{N}_{x+2n-1}-\mathrm{N}_{x+3n-1}}.$$

25. If P_x denote the annual premium for an insurance on a life x, and ${}_{\overline{n|}}\mathrm{P}_x$ the annual premium for a temporary assurance of n years on the same life, prove that

$${}_{\overline{n|}}\mathrm{P}_x=\mathrm{P}_{x+n}-\frac{\mathrm{P}_{x+n}-\mathrm{P}_x}{1-(v-\mathrm{P}_x)(v-\mathrm{P}_{x+1})\ldots.(v-\mathrm{P}_{x+n-1})}.$$

NOTES AND QUERIES.

Professor Oppermann, of Copenhagen, sends us the following curious problem:—

If x_1 be formed from x_0 by the formula, $x_1=x_0^{\frac{1}{x_0-1}}$

and in general, $x_{n+1}=x_n^{\frac{1}{x_n-1}}$

what will be the limit of the process?

He states that for every value of x_0, real or imaginary, except 0 or 1, $x_\infty=2$.

CORRESPONDENCE.

SOLUTION OF PROBLEM PROPOSED BY PROFESSOR DE MORGAN.

To the Editor of the Assurance Magazine.

Sir,—In the October number of the Assurance Magazine, Professor De Morgan, referring to Surrender Values of the form $1-\frac{1+a_y}{1+a_x}$ or $\frac{a_x-a_y}{1+a_x}$, says:—

"Now a_x-a_y is the value to (x) of a counter-survivorship—as we "may call it—of the following kind. The executors of the first who dies "pay an annuity of £1 to the survivor; and $(a_x-a_y)\div(1+a_x)$ is the "whole life premium which (x) should pay to be put in this position. "How, from the nature of this contract, does it follow that one payment of "this premium, over and above the annual premium which (x) should pay, "admits (y) to a policy of £1 at the premium for the age (x)?"

The following appears to me to be the reason.

Since a_x-a_y is the value of a counter-survivorship annuity of £1, $\frac{a_x-a_y}{1+a_x}$ will equal the value of a similar annuity of $\frac{1}{1+a_x}$.